Appendix C

Additional Sources of Information

Provided EMS Support to Wastewater Facilities

USEPA	www.epa.gov and www.epa.gov/owm/sectmis.htm
Cal-EPA	www.calepa.ca.gov/
Water Environment Federation (WEF)	www.wef.org/
Association of Metropolitan Sewerage Agencies (AMSA)	www.amsa-cleanwater.org/
Delaware Department of Natural Resources and Environmental Control (DNREC)	www.dnrec.state.de.us/dnrec2000/
North Carolina Division of Pollution Prevention and Environmental Assistance (NC DPPEA)	www.p2pays.org/ and www.p2pays.org/iso/
North Carolina Department of Environment and Natural Resources (NC DENR)	www.enr.state.nc.us/
North Carolina State University Industrial Extension Service (NCSU IES)	www.ies.ncsu.edu/
Texas Commission on Environmental Quality (TCEQ)	www.tceq.state.tx.us/ and http://www.tnrcc.state.tx.us/exec/sbea/ems/
Public Agency EMS Group	This is an informal group of public Oregon agencies that have, or are interested in, EMS. The group meets quarterly to share information and discuss EMS practices and procedures.
Registrar Accreditation Board	http://www.rabnet.com/index.shtml

Wastewater's Favorite Sources of EMS Information

- Benchmarking Report: Environmental Management Systems (http://www.cityofseattle.net/environment/Agenda_EMP.htm)
- Best Practices Guide: Application of ISO 14000 EMS for Municipalities (http://www.iie.org/programs/energy/pdfs/Applic%20ISO%2014000%20for%20Municipalities.pdf)
- EMS : An Implementation Guide for Small and Medium-Sozed Organizations (http://www.epa.gov/owmitnet/iso14001/ems2001final.pdf)
- EMS: Do They Improve Performance, University of North Carolina, January 2003. (http://ndems.cas.unc.edu/)
- EMS Troubleshooter's Guide for Local Governments (http://www.peercenter.net/troubleshooters.cfm)
- Ford Motor Company, ISO 14001 EMS Workbook, June 2000 (http://www.p2pays.org/ref/08/07378.htm)
- ISO 14001 Answer Book, Dennis Sasseville, 1997
- ISO 14001 Environmental Management Systems - Guidance Document, Specialty Technical Publishers
- The ISO 14000 Handbook, Edited by Joseph Cascio, ASQ Quality Press
- ISO 14001 Standard and related ISO 14000 series documents
- Management Systems for Public Utilities Integration Project (http://www.cityofseattle.net/environment/documents/AnnualReport2000-1.pdf)
- Moving Toward Comprehensive Utility Management Systems, Report of Environmental ISO 14001 "PIZZA", MGMT Alliance Inc. (http://www.mgmt14k.com/014kpizza.htm)
- NBP EMS Guidance Manual (http://biosolids.policy.net/emsguide/manual/)
- NSF – ISR Policies for Environmental Management Systems Registration. (http://www.nsf-isr.org)
- TCEQ Environnemental Management System, Interim Evaluation Protocols (http://www.tnrcc.state.tx.us/exec/sbea/ems/protocols.html)

Don't forget your current organization's O&M Plans and Environmental Policies and Programs as references and integration opportunities!

Wastewater's Favorite Websites for EMS Information

- NC DEPPA (www.p2pays.org)
- US EPA (www.epa.gov/owm/iso14001/index.htm) & http://www.epa.gov/ems/)
- US EPA Region IV (http://www.epa.gov/region04/)
- PEER Center (http://www.peercenter.net/)
- National Biosolids Partnership (http://biosolids.policy.net/)
- Kent County EMS Website (http://www.kentcountydpw.com/)
- National Database on EMS (http://www.eli.org/isopilots.htm)
- Local Government Environmental Assistance Network (LGEAN) Toolbox: (http://www.lgean.org/html/toolbox.cfm)
- Clean Texas (http://www.cleantexas.org)
- TCEQ Environmental Management Systems (http://www.tnrcc.state.tx.us/exec/sbea/ems/index.html)
- Texas Pollution Prevention Resources (http://www.p2plan.org/)
- MGMT Alliances Inc. EMS Homepage (http://www.mgmt14k.com/)
- King County Environmental Links (http://www.metrokc.gov/environ.htm)
- NSF International Strategic Registrations (http://www.nsf-isr.org/)
- PEER Center Local Resource Centers (http://www.peercenter.net/resourcecenters/)

In addition, several other organizations offer valuable EMS guidance and information, including, but in no way limited to, the following:

North Carolina EMS Program (http://www.p2pays.org/iso/)
Multi-State Working Group on EMS (http://www.iwrc.org/mswg/)
National Database on EMS (http://www.eli.org/isopilots.htm)
International Organization for Standardization (ISO) (www.iso.ch)
Registration Accreditation Board (RAB) (www.rabnet.com)

There are also several alternative EMS implementation guidance manuals available:

Continual Improvement in Utility Management: A Framework for Integration
This Guide responds to a defined need within utility management by providing a roadmap showing how a collective group of management initiatives interrelate and how a utility can best approach integrating them in the context of a continual improvement management system framework. This Guide was funded through a cooperative agreement with the U.S. Environmental Protection Agency (EPA), and sponsored by the Association of Metropolitan Sewerage Agencies (AMSA) and the Water Environment Federation (WEF). http://www.peercenter.net/ewebeditpro/items/O73F3799.pdf

An Environmental Management System Troubleshooters' Guide for Local Governments
The Environmental Management System (EMS) Troubleshooters' Guide for Local Governments has been compiled from experiences and lessons learned through various EMS Initiatives for Government Entities. The practical data and case study material has been extracted from over 23 municipal, state, and local organizations which implemented EMSs as participants in these initiatives. The document is structured to systematically lead a facility, by addressing the needs and issues that a facility might encounter, throughout the four phases of EMS implementation. http://www.peercenter.net/troubleshooters.cfm

Environmental Management Systems: An Implementation Guide for Small and Medium Sized Organizations
In December 2000, the U.S. EPA, in cooperation with NSF International, completed this revised version of the original guide intended to offer a plain English, common sense guide to organizations interested in implementing an EMS, using the basic Plan-Do-Check-Act model.
http://www.epa.gov/OW-OWM.html/iso14001/wm046200.htm

Environmental Management Tools for SMEs (Small and Medium Sized Enterprises) - A Handbook
A guidance document produced by the European Environment Agency intended for small- and medium-sized enterprises interested in implementing environmental management practices.
http://reports.eea.eu.int/GH-14-98-065-EN-C/en/enviissu10.pdf

Best Practices Guide: Application of ISO 14001 Environmental Management Systems (EMS) for Municipalities
This guide is for senior and mid-level technical staff (facility managers, directors of engineering or technical services, directors of capital planning) from municipal agencies, utilities and institutions who are interested in implementing an EMS. The guide provides enhanced technical, management and analytical tools for the development of a broader Municipality EMS and a more narrowly structured Municipal Facility EMS.
http://www.iie.org/programs/energy/pdfs/Applic%20ISO%2014000%20for%20Municipalities.pdf

ISO 14001 Guidance Manual
The USA-based National Center for Environmental Decision-making Research has created a document that is specific enough to set up and implement an EMS, but general enough to allow the flexibility for addressing unique characteristics. The various sections of the manual describe each element of the ISO 14001 standard and provide step-by-step procedures and tips for developing and implementing an EMS.
http://www.ncedr.org/guides/iso.htm

Appendix D

EMS Glossary

Glossary

American National Standards Institute Registrar Accreditation Board (ANSI-RAB) – Body that accredits ISO 14001 Environmental Management Systems (EMS) registrars and auditors.

Audit Finding – A discovery of lack of conformance to the requirements of an (ISO 14001-based) EMS criteria/checklist. All audit findings must be resolved as found during the internal audit or through a formal EMS process of corrective and preventative action.

Audit Finding – The discovery of a lack of conformance to the requirements of an EMS (ISO 14001-based) criteria/checklist. All audit findings must be resolved as found during the internal audit or through a formal EMS process of corrective and preventative action.

Auditor – Person with the qualifications to conduct an EMS audit.

Baseline – The starting point from which to track the achievement of an objective. Establish “normalized” baselines to accurately measure how your facility’s environmental performance could change over time. Normalized baselines will measure your actual environmental performance changes rather than changes in production, customer demand, or other non-environmental related factors.

Competency Training – Employees whose work may create a significant environmental impact must get appropriate training and be deemed competent based on education, training or experience. For example, most wastewater facilities need to have state licensed operators. The license is a way to demonstrate competency.

Conformance – To verify an organization's EMS to a specified standard (ISO 14001).

Continual improvement – The principle of continual improvement, as fundamental to the ISO 14001 Standard, is intended to ensure that an organization does not simply adopt an EMS, or other Plan-Do-Check-Act based management system, for cosmetic purposes and thereby remain static. Continual improvement is the process of enhancing a management system to achieve improvement in overall performance and effectiveness in line with the organization's management policies. It is one of the three main commitments of the EMS. After checking their EMS through monitoring and measuring, and find and fix audits, organizations apply the lessons they have learned to improve their environmental management.

Controlled Documents – Policies, procedures, manuals, and other documents that are a part of your EMS that require control or managed. A controlled document is one that is reviewed for relevance to your activities on a regular schedule (typically annually) to ensure that the most current version is being used "in the field."

Corrective Actions – As a result of the audit findings, corrective action reports (CARs) are assigned to all nonconformances to correct EMS deficiencies as they occur. CARs track an audit finding, and assign tasks to be completed, responsibilities, and timeframes.

Corrective Action Request (CAR) – A report form to identify, track and manage corrective actions.

EMS Core Team – A cross-functional team made up of individuals within the organization that helps facilitate EMS implementation across the organization. Team members are the EMS experts and cheerleaders.

Environment – Surroundings in which an organization or facility operates, including air, water, land, natural resources, flora, fauna, humans and their interrelation.

Environmental Aspect – Element of an organization’s activities, products or services that can interact with the environment. Aspects = Causes

Environmental Impact – Any change to the environment, whether adverse or beneficial, that results from an organization’s activities, products or services. Impacts = Effects

EMS Fenceline – Project scope and/or operational areas in an organization in which the EMS is implemented. For example, for wastewater operations, this could include the pretreatment and the laboratory operations.

External Communication – Providing information and soliciting input, receiving inquiries and complaints, responding, and documenting exchanges with interested parties outside the fenceline of your facility.

EMS Manual – An EMS document that describes your core system elements and how the different elements are interrelated. A "roadmap" for your EMS. Auditors find a manual very useful when verifying your EMS.

EMS Records – Reports, checklists, training, and other data generated that provides verification that your organization is following the EMS as intended.

Work Instruction – Documented work tasks at your facility that provide a detailed understanding of how specific work process(es) are accomplished. For example, an instruction or checklist on the proper disposal of recyclables (batteries, oils and greases, rags, etc.) in your auto maintenance shop.

Emergency Situation – Condition (e.g., spills, releases, fires, etc.) that can have an environmental impact and that requires an emergency response or action.

Emergency Response – Actions taken to address an environmental incident.

Emergency Response Plan – A detailed plan that describes the logistics, procedures, who to contact, roles and responsibilities, reporting requirements, etc. in the event of an emergency or spill.

EMS Audit – A planned and documented review performed in accordance with a documented audit procedure for the purpose of verifying, through interview and an evaluation of EMS documents and records, conformance with the applicable elements of your EMS.

EMS Auditor – A qualified and trained individual who conducts EMS audits. Each EMS Auditor should attend documented training that presents the requirements of a standard (e.g., ISO 14001) EMS and of your organization's EMS audit procedure and discusses their roles in an EMS internal audit.

EMS Lead Auditor – A qualified and trained individual who plans, organizes, and directs your organization's EMS internal audits. The EMS Lead Auditor is the leader of your EMS audit team and will report audit findings and observations to management.

Environmental Management System (EMS) – A system for identifying environmental and organizational issues and implementing improvements based on Deming's Plan-Do-Check-Act model. The EMS has 17 elements that help organizations achieve environmental policy commitments and environmental performance improvements.

Environmental Management Representative (EMR) – The clearly-identified EMS team leader who has the responsibility and management authority for implementing the EMS from start to finish.

EMS Core Team – A cross-functional team made up of individuals within the organization that helps facilitate EMS implementation across the organization. They are the EMS experts and cheerleaders.

EMS Audit – A systematic, documented verification process of objectively obtaining and evaluating an organization's EMS to determine whether or not it conforms to the environmental audit criteria pre-defined by the organization and applicable standards (i.e. the ISO 14001 Standard).

EMS Core Team – A cross-functional team made up of individuals within the organization that help to facilitate EMS implementation across the organization. These are the EMS experts and cheerleaders.

EMS Fenceline – Operational area or areas within an organization where the EMS is implemented.

EMS Fenceline – Project scope and/or operational areas within an organization in which the EMS is implemented.

EMS Implementation Team – Individuals within the organization who are closest to the actual workflow and who assist the Core Team and the EMR in better understanding operational activities. Implementation Teams are generally very involved in designing operational controls, testing emergency preparedness and response plans, and identifying the environmental aspects of their daily activities.

Environmental Target – Detailed performance requirement, quantified where practicable, based on an organization's defined environmental objectives and that must be met in order to achieve those objectives.

Environmental Aspect – Element of an organization's activities, products or services that can interact with the environment. Aspects = Causes

Environmental Impact – Any change to the environment, whether adverse or beneficial, that results from an organization's activities, products or services. Impacts = Effects

Environmental Objective – An overall environmental goal based on an established environmental policy, that an organization sets itself to achieve. Wherever possible, environmental objectives should be quantified, in order to facilitate the evaluation of environmental performance and the measurement of progress towards specific environmental targets.

Environmental Target – A detailed performance requirement, quantified where practicable, that arises from the environmental objectives and that needs to be set and met in order for the objective to be achieved.

EMS Awareness Training – Training involving an overview of the basics of your EMS, including your environmental policy, significant aspects, objectives and targets, and the importance of operating under specific procedures and work instructions (operational controls) required under the EMS.

Environmental Management Program (EMP) – A structured program with a set of specific identifiable actions (an "action plan") providing the direction for EMS objectives and targets to be obtained and tracked. Your EMP should assign tasks, resources, responsibilities, and timeframes for achieving your objectives and targets.

Environmental Management Representative (EMR) – The clearly-identified EMS team leader who has the responsibility and management authority for implementing the EMS from start to finish.

Environmental Management System (EMS) – A system for identifying environmental and organizational issues and implementing organizational improvements based on Deming's Plan-Do-Check-Act model. The EMS has 17 elements that help organizations achieve environmental policy commitments and environmental performance improvements.

Environmental Performance – Measurable results of the EMS related to an organization's control of its environmental aspects, based on its environmental policy, objectives and targets.

Environmental Policy – An organization's formal statement defining its intentions and principles in relation to its overall environmental performance. It provides a framework for action and setting environmental objectives and targets.

Environmental Objective – An overall environmental goal based on an established environmental policy, that an organization sets itself to achieve. Wherever possible, environmental objectives should be quantified, in order to facilitate the evaluation of environmental performance and the measurement of progress towards specific environmental targets.

Environmental Target – A detailed performance requirement, quantified where practicable, that arises from the environmental objectives and that needs to be set and met in order for the objective to be achieved.

"Footprint" – The environmental impact of your facility - how your operations and services interact with the air, water, land, resources, local and regional community, etc.

Gap Analysis – Preliminary assessment of an organization's environmental programs and management practices to see where they match up with EMS requirements.

Interested Parties ("Stakeholders") – An individual or group, internal or external to the organization, concerned with or affected by the environmental performance of your organization. For example, local residents, citizen groups, and environmental regulators are all examples of "interested parties." In addition, consider your own employees **–** inside and outside of your fenceline **–** to be interested parties.

Internal Communication – Flow of information top-down, bottom-up, and across your entire EMS fenceline.

ISO 14001 – One of the Environmental Management Standards developed by the International Organization for Standardization in Geneva, Switzerland. It is the requirements document that specifies the seventeen (17) elements of an EMS. It is the standard protocol (requirements document) in the ISO 14000 series that specifies the necessary elements of an EMS.

Key Characteristic – An element of an operation or activity that can be measured or evaluated for environmental performance of objectives and targets.

Legal Requirements – The set of rules and legal regulations that apply to the operations and services of an organization, including local, state, and federal laws.

Major Nonconformance – A deficiency in meeting the requirements of an EMS. One or more of the 17 elements of the EMS are not addressed (e.g., no system procedure) or implemented (e.g., not following a system procedure as written).

Minor Nonconformance – A finding that leads to a failure to conform completely with an EMS element, but is not considered to be a breakdown in your system. For example, a number of employees were overdue on their EMS refresher training.

Observation – A recognition of something done incorrectly or an area of concern. While not a major or minor nonconformance with an EMS requirement, if done correctly it could strengthen the EMS or if done incorrectly, could potentially cause a system failure.

Other requirements – The rules and guidelines that an organization follows that are not legally binding under existing environmental laws, but to which an organization is committed (e.g., industry standards or voluntary guidelines). Under an EMS, these requirements require the same commitment as legally binding requirements.

Operational Controls – Documents that specify the way to execute a certain activity or operation. Operational controls are assigned to operations and services involving significant aspects and are documented through the use of work instructions, procedures, manuals, programs, etc. Examples include maintenance work, pretreatment operations, chemical ordering, etc.

Performance Indicators – Measurement tools, selected by management that can be used to support the evaluation of environmental performance in relation to a specific target. Performance indicators may be adjusted to meet specific management needs or as necessary to ensure progress towards specific environmental targets.

Pollution Prevention – The development, implementation, and evaluation of efforts to avoid, eliminate, or reduce pollution at the source. Any activity that reduces or eliminates pollutants prior to recycling, treatment, control or disposal.

Preventive Actions – A proactive approach to managing actions that are assigned to any EMS nonconformance made that will prevent potential environmental issues before they occur.

Registrar – A third-party organization that awards the EMS certification.

Registration – A recognized validation that an EMS has passed an accredited independent, third-party audit.

Root Cause – Underlying reason that led to or may lead to an EMS nonconformance. For example, if a group of employees were not following a procedure, the underlying cause could be that they were not properly trained on the procedure or that an updated procedure was not communicated to them.

Self-Declaration – An internal review of conformance to all elements of an EMS. EMS self-declaration is an organization's statement that it conforms with all elements of the ISO 14001 Standard.

Stakeholders – Groups and organizations having an interest or stake in an organization's EMS (e.g., regulators, shareholders, customers, suppliers, special interest groups, residents, etc.).

Surveillance – A scheduled sampling of EMS elements to maintain a third-party registration.

System Procedure – An EMS (ISO 14001) required document that establishes purpose, scope, roles & responsibilities, the tasks to be completed, and where and how the associated records and documents are maintained.

Third-Party – An independent EMS auditor that is qualified to conduct EMS audits.

Top Management – Person or group with executive responsibility for the organization and the EMS.

Work Instruction – A series of steps and activities directed to a very specific area or process. Examples include cleaning the rake at wastewater pretreatment operations and calibrating a pH meter.